ALARM SWITCH

RELATED APPLICATIONS

Not applicable.

FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not applicable.

MICROFICHE APPENDIX

Not applicable.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention is concerned with the field of magnetic switches. In particular, the invention is concerned with a magnetic switch apparatus that detects relative movement between first and second members and defeats attempted external magnetic manipulation of the apparatus.

2. Description of the Prior Art

Prior art security alarm systems use magnetic switches attached to doors and windows and integrated with the system for detecting unauthorized opening indicating an intruder. One common type of magnetic switch is a so-called reed switch. This type of switch is subject to manipulation by an external magnet. That is, an intruder can use a magnet to hold the read switch closed (or open depending upon the control scheme) and thereby open a door or window without triggering the alarm system.

SUMMARY OF THE INVENTION

The present invention solves the prior art problem discussed above and provides a distinct advance in the state of the art. More particularly, the alarm switch hereof is configured to defeat attempts at external magnetic manipulation.

The preferred embodiment includes a rod-shaped, first switch element positioned transverse to and centrally aligned with a convex, second switch element and spaced therefrom. A ring-shaped first magnet is positioned about the first switch element and spaced from the second element in order to pull a ferromagnetic body into a switch-open position out of contact with the second switch element. These components are mounted to the first member such as a door frame. A second magnet mounted to the second member, such as the door, is positioned and magnetically sufficient to pull the body into a switch-closed position in contact with both of the switch elements when the members are in an adjacent position, that is, when the door is closed.

When the second member is moved to a separating position relative to the first member such as when the door is open, the second magnet is no longer effective to hold the body against both switch elements and the first magnet pulls the body out of contact with the second switch element to trigger the alarm system. Any use of an external magnet pulls the ferromagnetic body away from the centrally located first element thereby simulating an open door condition and triggering the alarm system. Other preferred aspects of the present invention are disclosed herein.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates preferred magnetic switch apparatus (shown in dashed lines) in accordance with the present invention and shown in use with a door frame and door;

FIG. **2** is a sectional view taken along lines **2**—**2** of FIG. **1** and also showing an intruder magnet;

FIG. **3** is a schematic illustration of the preferred alarm system using the apparatus of FIG. **1** in accordance with the present invention; and

FIG. **4** is a top front pictorial view of the preferred magnet switch assembly of FIG. **1**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. **1** illustrates preferred magnetic switch apparatus **10** (dashed lines) in accordance with the present invention shown in use with a door frame **12** and door **14**. FIG. **2** more clearly illustrates the details of apparatus **10** which broadly includes switch assembly **16** and operating magnet **18**.

Switch assembly **16** includes first switch element **20**, second switch element **22**, a ferromagnetic body in the form of ball **24**, retraction magnet **26** and electrically insulating upper wall **28**. First switch element **20** has a generally rod-shaped configuration and presents lower end **30** and upper end **32** with flange **34** therebetween nearest upper end **32**. Element **20** is preferably composed of metal to be electrically conductive.

Electrically conductive, second switch element **22** is integrally formed of sheet metal such as by stamping and includes disk-shaped bottom wall **36** presenting contact surface **38** and further includes side wall **40** circumscribing bottom wall **36**. As illustrated in FIG. **2**, bottom wall **36** is shaped so that contact surface **38** presents a convex configuration and in particular, a reversed, conically shaped configuration.

Upper wall **28** is preferably composed of glass (or other insulating material) and electrically insulates switch elements **20, 22** from one another. Upper wall **28** is spaced from contact surface **38** and is circumscribed by side wall **40**. The outboard face of upper wall **28** is flush with the upper edge of side wall **40**.

Upper wall **28** also includes central opening **42** defined therein for receiving the lower portion of first switch element **20** with flange **34** thereof engaging the outboard face of upper wall **28**. This positions first switch element **20** in alignment with the axis of contact surface **38** and spaces lower end **30** from contact surface **38**.

Upper wall **28**, bottom wall **36** and side wall **40** define switch chamber **44** with ferromagnetic ball **24** contained therein. As will be appreciated, ball **24** is electrically conductive and can be configured in other shapes such as a cube or cylinder, although the spherical shape is preferred.

Ball **24** is shiftable within chamber **44** between a switch-open position and a switch-closed position. In the switch-open position, ball **24** is not in contact with both switch elements **20, 22**. Such a position is illustrated by the dashed lines in FIG. **2** wherein ball **24** is in contact with only one of the switch elements, namely first switch element **20**. The switch-open position can occur also if ball **24** shifts along contact surface **38** toward side wall **40** and out of contact with switch element **20**. The switch-closed position is illustrated by the solid lines in FIG. **2** in which ball **24** is in contact with both switch elements **20, 22**.

Retraction magnet **26** presents a ring-shaped configuration in the nature of a torus and is positioned adjacent the outboard face of upper wall **28** surrounding flange **34** and thereby in surrounding relationship with first switch element **20**. This arrangement positions magnet **18** spaced from contact surface **38**. The magnetic field strength of magnet **26**